

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Master Schedule and Overview
WBS: All
Date Submitted: 2/24/00
Submitted By: Harry Weerts, Bill Freeman

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Central Preshower Module Fabrication Complete	12/16/97	12/16/97	0 w
X	M2-Central Preshower Installed on Solenoid	5/21/98	5/21/98	0 w
	M3-Level Ø-South Installed	3/23/00	2/9/00	6.2 w
	M1-Begin Shield Wall Removal/Ready to Roll-in	11/1/00	11/22/00	-3 w
	M2-Muon End Toroids Installed on Platform	1/18/01	11/15/00	8.1 w
	M1-Detector Rolled-in and Hooked Up	2/13/01	2/2/01	1.3 w

Note: the full set of reportable milestones are collected and sorted by date at the end of this report.

Areas of Concern

Technical

Refer to WBS level 3 system reports.

Schedule

The silicon detector remains on the critical path. Recent re-evaluations of the schedule with the goal of creating contingency have led to a proposal to split the silicon detector into two pieces for installation. This idea looks very promising and has led to several alternative schemes for installation. The scheme that is actually used will depend to a certain extent on the actual dates on which various other detector subsystems are ready, but all schemes have the beneficial effect of creating installation contingency for silicon as well as providing the potential for a longer period of uninterrupted commissioning for several other detector subsystems. We monitor the schedule on a bi-weekly basis and direct resources to areas where delays are developing. We remain confident that we will be ready in February 2001, but unexpected problems occur regularly and put pressure on the schedule.

Resources

No additional resources (manpower) were requested during this period.

Cost

The amount of contingency left at the end of January is very low.

Change Requests

None

Progress Summary

All major subsystems (Silicon, Fiber Tracker, and Muon) were in production in January. For both the fiber tracker and the forward muon system, we are beyond the critical point and the end is in sight. The main activity during this month was the identification of fallback options to make sure that we have a viable, physics-capable detector to roll in during February 2001. The document describing all fallback options was submitted to Fermilab and is available on the web in PDF format at the following URL:

http://d0server1.fnal.gov/projects/UpgradeProject/fallback_options/Fallback_Jan31_final.pdf

The fallback exercise resulted in the creation of at least 2.5 months of schedule contingency for the delivery of the silicon detector halves to DØ.

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for the month of January, 2000

Subsystem: Silicon Tracker
WBS: 1.1.1
Date Submitted: 2/10/00
Submitted By: Marcel Demarteau, Ron Lipton

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	H Half-Wedge Fabrication 20% Complete	10/15/99	10/15/99	0 w
X	3 Chip Ladder Fabrication 80% Complete	10/26/99	10/20/99	0.6 w
X	9 Chip Ladder Fabrication 20% Complete	11/4/99	11/3/99	0.2 w
X	F Wedge Assemblies 20% Complete	1/24/00	1/19/00	0.4 w
X	6 Chip Ladder Fabrication 20% Complete	1/31/00	1/3/00	3.9 w
	9 Chip Ladder Fabrication 80% Complete	3/10/00	3/27/00	-2.2 w
	M2-First Silicon Tracker Barrel/Disk Module Complete	3/17/00	1/24/00	7.8 w
	H Half-Wedge Fabrication 80% Complete	3/29/00	2/23/00	5 w
	6 Chip Ladder Fabrication 80% Complete	4/18/00	3/14/00	5 w
	F Wedge Assemblies 80% Complete	5/3/00	4/26/00	1 w
	H-disks Ready	8/15/00	7/3/00	6 w
	M3-All Silicon Tracker Barrels/Disks Complete	8/25/00	8/25/00	0.2 w
	Central Silicon Complete & Ready To Move To DAB	9/18/00	9/18/00	0.2 w
	M1-Central Silicon Complete	9/18/00	9/18/00	0.2 w
	M2-Silicon Tracker Installed in Solenoid/Fiber Tracker	9/25/00	9/25/00	0.2 w

Areas of Concern

Technical

- The stuffing of the high density interconnects at Promex is still a concern, both in terms of yield and turnaround time. As mentioned in the previous report, the company recently “lost” 14 F-disk HDIs. The turnaround time at the company has been rather good in the past. Work generally started within a week after parts were received. The company now, however, insists on a four-week lead-time. Fifty F-disk HDIs and forty-five 9-chip HDIs are at the company waiting for work to commence. A second vendor, Silitronics, is being qualified as an alternative to Promex. Current yields indicate that Silitronics is at least on a par with Promex. Given our better relationship with the management of Silitronics, we anticipate better performance for the next batch of HDIs.
- Given the low yield of HDI stuffing, the supply of SVX chips is being depleted at a rapid rate. An inventory is being conducted of the SVX chip supply.
- Some of the 90-degree double-sided, double-metal sensors from Micron showed flaws in the implants. For a few strips the p-stop implant would touch the n-implant, giving rise to a noisy region around that strip. The area affected can be as large as ten to fifteen strips. Tests are being conducted to reduce or possibly eliminate these regions of noise by exercising various options to bias the p-stop implant.
- The baseline design of the silicon detector calls for the silicon to be mounted in a single long carbon fiber support structure. The silicon group has put forward a proposal to split the support structure in two equal halves at $z=0$. Its motivation lies in the added ability to allow the silicon detector to be removed / installed in the DØ collision hall. Benefits include: a reduction in the time to service silicon after roll-in from roughly six months to perhaps two months; the ability to de-couple silicon installation from installation of ECS on the center beam; the ability to install and begin to commission a significant portion of silicon before all silicon has been completed; and better internal alignment of silicon within either of the two support cylinder halves. Disadvantages include: added carbon fiber structures near $z=0$; greater coupling of silicon alignment with CFT barrel 1 stability; the need for methods to align the two cylinder halves at $z=0$; and the possible need for greater attention to low-mass cable handling during silicon installation. Additional engineering effort will be needed to study the full implications of this design change. The split support cylinder has been adopted as our current baseline design, while further studies are being conducted.
- Cosmic ray data-taking with a limited set of ladders in a spare bulkhead set is being delayed by the setup of an asynchronous trigger. The problem of the narrowing of clock signals when running with a set of six low-mass cables was understood. A system of six low-mass cables can be read out error-free at a level of 10^{13} .

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Schedule

- The delivery of 90-degree double-sided, double-metal detectors from Micron remains a concern. The sputterer used in the deposition of the metal layers failed at the end of January, essentially stopping further processing of the sensors and putting more strain on the already tight delivery schedule. Ladder production for the 90-degree detectors is already being paced by Micron delivery. A lot of sensors are in the production pipeline, however, and additional 6-chip ladder fixtures have been ordered to accommodate a larger ladder production rate in case large numbers of sensors arrive. The milestone of having 6-chip ladder fabrication 20% complete was met 3.9 weeks later than the baseline schedule.
- Promex is now quoting a turnaround time of four weeks for stuffing HDIs. They currently have fifty F-disk HDIs and forty-five 9-chip HDIs, but delivery will be delayed. This will adversely affect ladder and wedge production. Ladder production for the 2-degree ladders has slowed due to the non-availability of HDIs. F-wedge production is similarly affected. The slowdown in 9-chip ladder production will be used to restart 3-chip ladder production. Four fixtures have now been qualified for 9-chip ladder production. The new procedure for the production of 2-degree detectors, described in last month's report, has now been adopted and increases production by 25%. With four fixtures available we now have a 9-chip ladder production capacity of four ladders per day.
- Taking cosmic-ray data with a partial set of ladders installed in a spare bulkhead has been set back due to difficulties setting up the cooling system and providing the proper interlocks. In addition, setting up the asynchronous trigger is far from trivial and will take more time than anticipated.
- H-wedge production is progressing according to schedule. Full wedges have been built from half-wedges using a dual camera "bi-facial" fixture, and this has yielded mechanically adequate wedges. Mounting of H-wedges on the cooling ring has been started, but is still awaiting final calibration of a Zeiss 500 CMM.
- F-wedge production has started and the 20% complete milestone was reached two days later than the baseline schedule. The mounting of F-wedges on a ring has started and procedures are being developed.

Resources

There has been some influx of physicist manpower during the last month. Most of the new people are working on debugging and testing of ladders and wedges since that is a very time-consuming effort where we have been falling behind. Technicians are available for detector repair work from 6am until 7pm, five days per week. While all aspects of ladder and wedge production are ramping up, work also will start to assemble barrels and disks. Barrel and disk assembly requires special skills from the technical support crew. There is not enough technical support to sustain all activities at the same level so resources will have to be re-allocated. This will certainly adversely impact some areas of production.

Cost

Because of the low yield in mounting components of the flexible read-out circuits, we were forced to purchase additional parts. The original 20% spares were not sufficient, especially for parts used in the early phase of production. All orders for replacement parts have been placed. There is a remaining worry that the cost for the low-mass cable will increase since the vendor, Allied Signal, works on a cost recovery basis.

Change Requests

Because of the anticipated rate of sensor delivery from Micron, and to synchronize the 6-chip and 9-chip ladder production, a request is made to move the 6-chip ladder production complete date to June 2, 2000.

Progress Summary

All detector types are in production. Because of vendor problems, however, production for all detector types will lag. All vendor problems are being pursued aggressively.

- The "6-chip Ladder Production 20% Complete" milestone was achieved 3.9 weeks later than scheduled, mainly due to Micron delivery problems and sensor quality.
- The "F-Wedge Production 20% Complete" milestone was achieved nearly on schedule.
- Production of 3-chip ladders will restart soon.
- H half-wedge production is well understood and is proceeding adequately. The procedure for building full wedges has been started and yields mechanically sound ladders.

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- The first H- and F-wedges have been mounted on their respective cooling rings and procedures are being developed. The team to test and repair ladders and wedges has been strengthened. The repair process is better understood, although problems remain. HDI and ladder burn-in systems are working well and are being used routinely by shift personnel. The low yields of HDI stuffing remains a problem. The 12-ladder test team is in place and has installed and measured mechanical ladders in barrels, and the read-out system is nearly ready to take cosmic-ray data.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Fiber Tracker and VLPCs
WBS: 1.1.2
Date Submitted: 2/16/00
Submitted By: Alan D. Bross

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	<i>Detector</i>			
X	M2 - Assembly Design Complete	3/5/99	3/5/99	0 w
X	M2-First Cylinder Complete	9/2/99	9/2/99	0 w
X	M3-Fiber Tracker Ribbon Fabrication 50% Complete	11/5/99	11/12/99	-0.9 w
X	M2-Fiber Tracker Assembly Begun	2/1/00	12/6/99	6.2 w
	M3-Fiber Tracker Cylinders 8, 7, 6, and 5 Complete	3/2/00	1/28/00	5 w
	M3-Fiber Tracker Ribbon Fabrication Complete	3/6/00	3/6/00	0 w
	Waveguide Production 50% Complete	3/16/00	1/29/00	6.8 w
	M3-Fiber Tracker Ribbon Mounting Complete	5/3/00	4/20/00	1.9 w
	M2-Fiber Tracker Assembly Complete	5/17/00	5/4/00	1.9 w
	M3-Waveguide Production Complete	8/2/00	6/5/00	8.4 w
	<i>VLPCs</i>			
X	M2-VLPC Production 50% Complete	8/31/97	8/31/97	0 w
	M3-VLPC Cassette Assembly 50% Complete	6/5/00	4/12/00	7.4 w
	M3-VLPC Cryo System Operational	7/7/00	6/12/00	3.6 w
	M3-VLPC Cassette Assembly Complete	10/13/00	8/22/00	7.4 w

Areas of Concern

Technical

None

Schedule

None

Resources

Additional CMM operator coverage for Lab 3 would be very beneficial

Cost

None

Change Requests

None

Progress Summary

- Ribbon production is going well, and will finish in March.
- Mounting for cylinders 6, 7, and 8 is complete; this corresponds to 50% of all ribbons mounted.
- The machine for nesting the cylinders inside each other has been debugged and is ready to receive the first cylinder (#8).
- 100-part VLPC cassette flex circuit prototype order is complete.
- Two production VLPC cassettes are complete and under test.

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Subsystem: Forward Preshower
WBS: 1.1.4
Date Submitted: 2/7/00
Submitted By: Abid Patwa

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Forward Preshower Module Fabrication Begun	11/4/98	11/4/98	0 w
	M3-1st Forward Preshower Detector Complete	2/24/00	1/12/00	6.2 w
	Module Fabrication and Testing Complete	3/31/00	12/10/99	14 w
	M3-2nd Forward Preshower Detector Complete	4/7/00	3/8/00	4.4 w

Areas of Concern

Technical

Final assembly of the south detector with the lead absorber elements has started after delivery of the outer support ring from the BNL heavy shop. Many of the necessary alignment issues concerning the individual elements for the detector were addressed prior to the delivery of the ring and no major problems are expected in assembling the complete detector.

Schedule

A delay in the arrival of the lead outer support ring element from the BNL heavy shop has resulted in a late start for the production of the bonded lead pieces. Excellent results have been obtained on the initial ones and no problems are expected during production. However, given the late start, the completion of the 1st detector will be about six weeks behind schedule. This has no effect on the overall DØ completion date.

Resources

Additional manpower will most likely be needed to help with the full fiber-to-fiber inspection, module cabling, and certification required for the north detector.

Cost

None

Change Requests

None

Progress Summary

- All modules (i.e. 14 large, 14 small, 4 special) required for the south detector were fully cabled, inspected and certified. Consequently, these modules are ready to install into the detector support structure.
- Certification of modules that are required for the north detector is 50% complete.
- Module cabling as well as installation and testing of calibration systems for the remaining modules in the north FPS continued.
- The lead outer support ring arrived from the BNL heavy shop, beginning the final phase of installation and alignment of the complete detector on the vertically mounted spherical dome at Brookhaven.
- Production of bonded lead-stainless steel pieces for the south detector started and is 15% complete.
- Final production prints of the outer FPS mounting hardware that jointly supports the FPS detector with individual ICD tiles on the EC head at DØ were made and agreed to with the ICD group.
- A cable routing plan for the FPS clear waveguides that are routed uniformly along the EC head from the detector to VLPCs at the readout platform was established. Initial cable lengths along with a fiber-to-fiber mapping at each connector interface have been determined.

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Subsystem: Tracking Electronics
WBS: 1.1.5
Date Submitted: 2/14/00
Submitted By: Marvin Johnson

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	First Readout Crate Installed & Working	11/16/99	12/2/99	-2 w
	Multichip Modules Received	4/5/00	2/23/00	6 w
	Ten 8-chip Analog Boards Available	4/26/00	4/19/00	1 w
	10 Digital Boards Available	6/8/00	3/22/00	11 w
	Mixer Boards Ready	8/3/00	6/22/00	5.8 w

Areas of Concern

Technical

We are able to set a threshold to see two photoelectrons on some channels of the SIFT chip but there is too much spread in the thresholds to do this for an entire multi-chip module (72 channels). This is not true for an isolated MCM, so it is thought that the spread is due to noise from the discriminator outputs feeding back into the inputs. A new board layout that addresses this has been completed and new boards will arrive in February.

Schedule

None

Resources

None

Cost

None

Change Requests

None

Progress Summary

- Six of the twelve silicon readout crates are installed and tested. All rack prep for the remaining six is complete. These six crates have been loaned to the Level 2 trigger group for development. We expect them to be returned in about a month. At that time the remaining six crates will be completed.
- VRB controller delivery should be complete in February.
- Sequencers are shipping but they may not be complete until March.
- The digital Level 1 trigger board for the Central Fiber Tracker (CFT) is under test with few errors.
- The analog front-end board re-layout is starting and should be finished in March.
- The VHDL code for the Level 1 CFT fiber trigger is nearly complete (awaiting hardware for final testing). Work continues on the Level 2 section. It should be finished by August.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Calorimeter Electronics
WBS: 1.2.1
Date Submitted: 2/18/00
Submitted By: Mike Tuts

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	SCA Testing Complete	11/23/99	12/15/99	-2.8 w
	Shaper Hybrid 50% Complete	2/22/00	5/9/00	-11 w
	M2-Calorimeter Preamp System Test Complete	4/18/00	3/31/00	2.4 w
	M3-Calorimeter CC,ECN Preamp Installation Complete	5/2/00	3/31/00	4.4 w
	Timing System Installed	8/18/00	8/18/00	0 w
	Daughterboard Vendor Production Complete	8/21/00	6/16/00	9 w
	BLS Motherboard Assembly Complete	10/10/00	8/7/00	9 w
	M2-Calorimeter BLS Assembly Complete	11/30/00	9/26/00	9 w

Areas of Concern

Technical

- A preamp cooling prototype is under design and construction. There is a technical risk in that space constraints may preclude the use of the proposed system, or require significant cable re-routing work.
- A final attempt at wire bonding SCA devices from the first 4" lot has proved more successful than originally anticipated, and we will proceed to bond all acceptable wafers that we have in hand. If the yields from this test lot hold up, we will significantly reduce our need for additional devices.

Schedule

- We continue to experience incremental delays in a number of subsystems relative to the baseline schedule. In particular, elements of the BLS system (the daughter card) are further delayed by about two weeks from the last report due to delays caused by late delivery of parts from the vendor and longer than estimated delays in board layout. Unless we can recover this time during construction of checkout, this will lead to a delay in the start of cosmic ray commissioning in late August/September by the same amount of time. Ultimately we can recover the delays by shortening the amount of commissioning time.
- The other critical path item is the re-work of the BLS power supplies. We have ordered two prototype transformers, and identified space where the work can take place. We will have a better understanding of the schedule once we have assembled the prototypes – presently we assume ~two days per supply. This effort will require additional manpower to maintain the schedule.
- The assembly of the preamp motherboards is proceeding more slowly than originally anticipated (100 per week), but does not constitute a significant schedule risk.

Resources

The BLS power supply removal, rework, and installation will require an additional technician FTE beyond the resources controlled by the Calorimeter group.

Cost

The principal cost risk remains the SCAs. We continue our discussions with the Business Services Section at Fermilab to see if we will be able to obtain additional SCAs for free or at reduced rates from the vendor because of the yield problems in the devices we currently hold.

Change Requests

None

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Progress Summary

- The 1,000 H-species preamps ordered from our U.S. vendor are in production. That order will complete all preamps including spares. The first 200 have been received.
- About 400 preamp motherboards have been assembled, populated with preamps and tested.
- We are carrying out a burn-in test of 5,000 channels of the new preamps in our test system.
- We have begun installation of the populated preamp motherboards in the detector.
- Preamp power supply construction is complete and two of the 24 new supplies are being installed in the detector for in-situ testing.
- We have successfully read out and controlled power supplies using the controls system. Further debugging is underway.
- We have collaborated with the online group and read out a full chain of electronics in the detector (using new preamps and old BLSs) including user interfaces and displays.
- Prototype transformers have been shipped from the vendor. We are ready to begin the construction of prototype BLS power supplies.
- The first of eight final prototype BLS motherboards and forty daughter cards have been received and are under test.
- The 65,000 production BLS shaper hybrids have been received.
- Operational readiness clearance documentation for the preamp system (power supplies, backplanes, motherboards, pulser system) has been submitted and is under review.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Intercryostat Detector
WBS: 1.2.2
Date Submitted: 2/23/00
Submitted By: Andy White

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	M3-ICD Tile Modules Ready	3/17/00	1/18/00	8.6 w
	M2-ICD Modules Arrive at Fermilab	3/24/00	1/25/00	8.6 w
	M3-InterCryostat Detectors Installed	3/31/00	2/1/00	8.6 w
	Drawers Ready	5/10/00	12/14/99	19.2 w

Areas of Concern

Technical

- Quality control on short WLS fibers continued – replacing fibers with too much bend.
- Fiber Systems Inc have failed to produce any fiber cable prototypes – we are considering making the cables in house.
- The T-pieces to hold the fibers in the grooves in the tiles have been made and work well.
- A solution needs to be found to route our signal cables through a new chute down from the EC.

Schedule

- The ICD preamps have finally arrived – but not in time to allow testing of our tiles with the new electronics.
- We are matching our supertile delivery schedule to that of the FPS – we will now probably mount North and South ICD and FPS together in the March/April time frame.

Resources

We have hired a half- time engineering student to help with tile assembly.

Cost

The cost of making the fiber cables “in-house” is not yet known.

Change Requests

None

Progress Summary

- Twenty-three supertiles have been tested with good results.
- Motherboard design was approved for fabrication.
- Clear fibers for backplane connections are being polished at Lab 7.
- All parts for PMT holders (on electronics drawers) are now available.

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Subsystem: Muon Central
WBS: 1.3.2
Date Submitted: 1/31/00
Submitted By: Tom Diehl

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	PDT Commissioning Complete	8/7/00	6/9/00	8 w
	CFA Commissioning Complete	9/13/00	7/10/00	9.3 w

Areas of Concern

Technical

Concerns about the WAMUS PDT gas systems have eased. Significant progress has been made in the design and installation of one of the two gas systems that are needed. While this task isn't complete yet, commissioning should not be limited by the gas system over the next six weeks.

Schedule

The CFA counter commissioning slipped a month during January because there are no physicists working on it.

Resources

There are still only a small number of physicists (2.4 FTEs and no post-docs) available for commissioning the three central muon detector systems. This is an improvement of 0.2 FTEs since last month through recruitment from the software effort, but more resources are required. Eventually, this shortage may impact central muon commissioning efforts through failure to develop the tools required to maintain and operate larger pieces of the detector systems.

Cost

None

Change Requests

None

Progress Summary

- Installation of the A- ϕ calibration system continued.
- Significant progress was made on the design and installation of one of the two WAMUS gas systems.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Muon Forward Trigger Detectors
WBS: 1.3.3
Date Submitted: 02/8/00
Submitted By: Dmitri Denisov

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Muon Forward Trigger Counter Assembly 10% Complete	10/12/98	10/12/98	0 w
	All Pixel Octants Assembled	2/22/00	4/4/00	-6 w
	All Muon Forward Trigger Detector Planes Installed	10/30/00	8/25/00	9 w

Areas of Concern

Technical

None

Schedule

- Design and production of A-layer pixel supports.
- The nine-week slippage in the "All Muon Trigger Detector Planes Installed" reflects the deliberate delay introduced into the B-layer MDT and pixel installation to avoid potential resource conflicts with other installation tasks. The detector roll-in date is not affected by this delay.

Resources

Engineering/drafting resources are the major current concern.

Cost

None

Change Requests

A set of cost change requests was submitted to M. Tuts in January 2000.

Progress Summary

Assembly and testing of pixel B-layer octants began in January 2000 and is proceeding at a rate of two to three octants per week. At this rate, all B-layer octants should be assembled by early March and tested by late March 2000.

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Subsystem: Muon Forward Tracker
WBS: 1.3.4
Date Submitted: 02/8/00
Submitted By: Dmitri Denisov

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Muon Forward Tracker MDT Assembly 10% Complete	1/29/99	1/29/99	0 w
X	Arrival Of C-Layer MDT Modules At FNAL	11/3/99	10/22/99	1.7 w
	M2-All Muon Forward Tracker MDT Modules At Fermilab	3/15/00	3/10/00	0.6 w
	B-Layer Octants Assembled	7/14/00	4/18/00	12.2 w
	All MDT Octants Assembled	7/14/00	7/14/00	0 w
	Muon Forward Tracker B-Layer Planes Installed	10/9/00	6/15/00	16 w
	All MDT Planes Installed	10/9/00	8/4/00	9 w

Areas of Concern

Technical:

The flatness of MDT honeycomb panels delivered from vendor is expected to be within specifications.

Schedule:

Production of parts for the C-layer octant assembly is driving the schedule. The 12-week slippage in the "B-layer Octants Assembled" reportable milestone reflects the deliberate rearrangement of the schedule to produce C-layer octants before B-layer ones, in order to create contingency in the overall installation schedule during the coming year. The "All MDT Octants Assembled" milestone has not changed as a result of this rearrangement. The sixteen-week slippage in the "...B-Layer Planes Installed" milestone is also partly due to this rearrangement as well as some additional delay that was deliberately introduced to avoid potential resource conflicts with other detector installation activities. The roll-in date is not affected by this additional delay.

Resources:

Engineering/drafting resources primarily related to octant support and installation fixturing are the major current concern.

Cost:

None

Change Requests:

A set of cost change requests was submitted to M. Tuts in January 2000.

Progress Summary:

- MDT A-layer octant production was finished on schedule in late January. Tests of A-layer octants are in progress.
- Design of the A-layer MDT mounts was finalized and fabrication began.
- Drawings for C-layer octants were finished and submitted for quotes.
- Fabrication of the EMC trusses was completed.

DØ Upgrade Monthly Progress Report

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Subsystem: Muon Electronics
WBS: 1.3.5
Date Submitted: 2/14/00
Submitted By: Boris Baldin

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	MDT ADB Fabrication Complete	12/2/99	12/2/99	0 w
X	MDC Fabrication Complete	1/31/00	12/13/99	5 w
X	M2-Muon Electronics Preproduction Installation Complete	1/31/00	12/13/99	5 w
	FEB, CB Production Complete	2/28/00	1/3/00	8 w
	SFE, SRC Fabrication Complete	4/24/00	2/3/00	11.5 w
	MRC, MFC Production Complete	5/24/00	3/27/00	8.4 w

Areas of Concern

Technical

The MFC prototypes are still under system test. The final production release meeting for the MFC is scheduled for February 28.

Schedule

Because of the delays with the MFC project, muon sub-systems will suffer some delays in system tests.

Resources

None

Cost

None

Change Requests

None

Progress Summary

- Six of ten major Muon Electronics projects are either in production or completed.
- Two of the four remaining projects will start production at the end of February.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Trigger
WBS: 1.4.1-1.4.5
Date Submitted: 2/23/00
Submitted By: Gerald C. Blazey

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	SLICs Received	12/10/99	11/10/99	4 w
X	M3-Establish Single Crate Internal Data Movement	2/17/00	1/6/00	6 w
	Preproduction MTCxx, MTFB, and MTCM Complete	4/3/00	1/24/00	10 w
	M3- Cal Readout Available to L2	4/5/00	2/11/00	7.6 w
	Alpha Cards Received	5/15/00	5/15/00	0 w
	MBTs Received	5/18/00	3/16/00	9 w
	M3-L3 Operational (One Full Chain)	6/29/00	6/1/00	4 w
	Global Installation Complete	7/21/00	7/12/00	1.4 w
	L2 Muon Installation Complete	7/31/00	7/26/00	0.6 w
	L2 CTT Installation Complete	8/7/00	8/9/00	-0.4 w
	L2 Cal Installation Complete	9/5/00	8/21/00	2 w
	Production MTCxx, MTFB, and MTCM Complete	9/7/00	6/27/00	10 w
	M3-Muon Level 1 Trigger Preproduction Testing Complete	9/20/00	4/18/00	21.6 w
	M3-Trigger Level 2 Commissioned	10/3/00	9/21/00	1.6 w

Areas of Concern

Technical

There is some concern over higher-than-expected threshold variations of the Multi-Chip Module (MCM) channels. Work continues in this area. Transmission errors for Level 1 muon cables to the Level 2 muon crate were unexpectedly high. The source of errors is currently under study.

Schedule

A schedule re-evaluation of the Level 1 tracker analog front-ends shows final deliveries in the last months of 2000. The delay can be partially attributed to the desire to design and build the 8 MCM and 12 MCM cards in series. This will not delay roll-in, but will require careful management of commissioning.

Resources

Additional technical help for the Level 1 tracking and preshower triggers would be helpful.

Cost

None

Change Requests

None

Progress Summary

- The Level 1 and Level 2 Frameworks have nearly finished preparation for the March cosmic ray run.
- Design and assembly of the luminosity monitor electronics continued.
- Work on the Level 1 calorimeter trigger included design of the input circuitry and trigger tower summing resistors. Tests of the Level 1 muon components continued both at the University of Arizona and Boston University. These tests included preparation for the March cosmic ray run. Extensive progress has been made on the tracking and preshower Level 1 triggers: MCM production has started, transfer of the Mixer design to the CD was nearly completed, most of the digital electronics has been completed, and purchase orders for many components were written. The 8-MCM and 12-MCM front-end card designs have also progressed, however a re-evaluation of the schedule shows delivery of the 8- MCMs in September 2000 and the 12-MCMs later in the year.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

- Good progress was made on the major Level 2 components. A prototype alpha and preproduction magic bus transceiver (MBT) were successfully tested together. The SLIC hardware was completed and the firmware nearly finalized. A redesign of the Level 2 software was initiated, primarily to accommodate simulation requirements. Progress continued on the Level 2 Calorimeter and Level 2 Muon algorithms. The Level 2 Silicon Track Trigger group prepared for the February 25th final technical review.
- Level 3 software development continued, partially in response to required DAQ support for SiDet, Lab 3, and the upcoming cosmic ray run. Design work on the hardware continued, with good progress being made on a prototype hardware VME readout controller (VRC).

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Subsystem: Online
WBS: 1.5.1
Date Submitted: 2/24/00
Submitted By: Stuart Fuess

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	Steady DAQ Running	4/20/00	3/31/00	2.7 w

Areas of Concern

Technical

None

Schedule

None

Personnel

None

Cost

None

Change Requests

None

Progress Summary

January activities principally concentrated on preparations for meeting the "Steady DAQ Running" reportable milestone and a separate March 15th commissioning milestone. The focus of these milestones is to have an "available" DAQ system for commissioning needs.

Specific activities:

- The header structure of the event message as transported throughout the Online system was established. The header includes routing and streaming information. A new C++ message class was created to implement the structure.
- Improved error detection and response on EPICS control of 1553 devices.
- Implementation of ORACLE database tables for description of SMT configuration.
- Examination of coherent error logging scheme for DAQ applications.
- Expanded communication capabilities between COOR and the Level 1 control computer.
- Commissioning of the Cisco 6509 network switch

DØ Upgrade Monthly Progress Report

for the month of January, 2000

January '00 Financial Summary

The month of January fiscal year 2000 closed with obligations for the DØ Upgrade Project totaling \$2,169K on equipment M&S funds and \$55K on Solenoid AIP Plant funds. The current spending plan, which shows that spending continues to exceed the plan for FY00, has been downloaded from the current Project schedule. Because the latest version of the Upgrade Project Cost Estimate still needs to be loaded into the Project's schedule, the probability for changes to this spending plan is high. The Project was allocated an M&S budget \$3,104K during November. DØ expects to spend the full FY00 budget. The remaining DoE funding of \$402K will be allocated during fiscal year 2001.

The M&S Upgrade Project balance is currently \$3,904K, excluding contingency. Contributions to the Upgrade currently total \$1,800K. These contributions help to reduce the M&S balance. DØ Upgrade Spokespersons are in the process of negotiating additional contributions, but at this time, these funds are still unspecified. The balance in AIP funds is \$265K. Once the Solenoid Project is complete, the unobligated AIP balance will be transferred to Upgrade M&S Equipment as budget dollars to be spent in either FY00 or FY01. Although some claims have been made on the contingency total presented at the November DoE review, management will continue to watch spending closely in an effort to reduce further decreases in the total contingency. All sub-project managers are continuously asked to review spending and if necessary, reevaluate cost estimates. See the following table and chart for further details concerning budget and spending.

The Project currently has commitments with universities and other institutions in the DØ Collaboration, via active Memoranda of Understanding (MoU), totaling \$8,745K. These funds represent an obligation on the part of the DØ Upgrade Project and are regularly costed each month via invoices received from these institutions as work is completed. In addition, several institutions have made significant contributions to the DØ Upgrade. A list of the universities and other institutions involved as well as a more detailed breakdown of the commitments and costs follows.

DØ Upgrade Monthly Progress Report

for the month of January, 2000

FY00 Financial Report as of 1/31/00

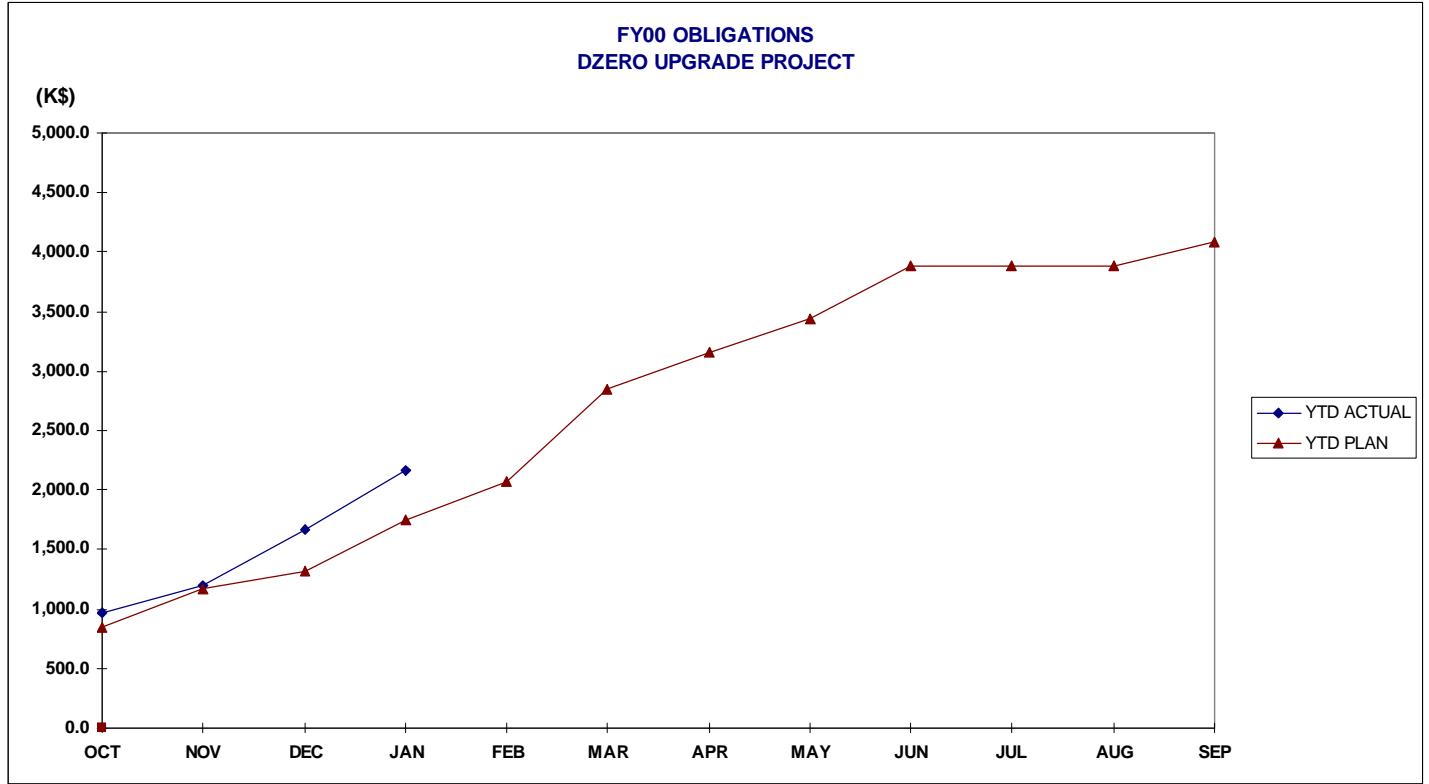
	<u>COST ESTIMATE</u>	<u>PRIOR YR OBLIG</u>	<u>FY 00 YTD OBLIG</u>	<u>PROJECT BALANCE</u>
1 TOTAL DZERO UPGRADE PROJECT	40,351.2	34,277.7	2,169.3	3,904.2
1.1 TRACKING DETECTORS	19,137.5	16,800.1	1,568.9	768.5
1.1.1 SILICON TRACKER	7,578.6	6,162.9	747.7	668.0
1.1.2 FIBER TRACKER	7,281.1	6,976.3	440.0	-135.2
1.1.3 CENTRAL PRESHOWER DETECTOR	238.1	238.2	0.0	-0.1
1.1.4 FORWARD PRESHOWER DETECTOR	510.9	500.3	13.0	-2.4
1.1.5 TRACKING ELECTRONICS	3,528.7	2,922.3	368.2	238.1
1.2 CALORIMETER	4,618.1	4,161.6	48.1	408.4
1.2.1 FRONT-END ELECTRONICS	4,315.8	3,913.8	43.8	358.3
1.2.2 INTERCRYSTAT DETECTOR	302.2	247.9	4.3	50.1
1.3 MUON DETECTORS	9,284.7	7,829.6	482.1	973.1
1.3.1 COSMIC RAY SCINTILLATOR	1,223.2	963.2	0.0	260.0
1.3.2 CENTRAL TRIGGER DETECTORS	910.3	720.6	45.0	144.6
1.3.3 FORWARD TRIGGER DETECTOR	2,033.6	1,673.1	20.3	340.2
1.3.4 FORWARD TRACKING DETECTOR	1,213.4	936.5	287.5	-10.5
1.3.5 FRONT-END ELECTRONICS	3,904.3	3,536.2	129.2	238.9
1.4 TRIGGER	6,588.9	5,193.1	15.4	1,380.4
1.4.1 FRAMEWORK	1,859.4	1,859.4	0.0	0.0
1.4.2 LEVEL 0	136.4	124.2	0.0	12.2
1.4.3 LEVEL 1	1,427.9	1,120.0	15.4	292.5
1.4.4 LEVEL 2	2,079.8	1,275.9	0.0	803.9
1.4.5 LEVEL 3	1,085.5	813.7	0.0	271.8
1.5 ONLINE EQUIPMENT	722.0	293.4	54.8	373.8
1.5.1 ON-LINE EQUIPMENT	722.0	293.4	54.8	373.8
<hr/>				
3.1 TOTAL SOLENOID PROJECT	5,168.0	4,848.2	55.1	264.7
3.1.1 SOLENOID	5,168.0	4,848.2	55.1	264.7

DEFINITION OF TERMS:

Funds: DØ Upgrade = M&S Equipment Funds; Solenoid = AIP Plant Funds.
 Cost Estimate: Total Project and Sub-Project Budgets without contingency.
 Prior Year Obligations: Obligations for fiscal years '92 through '99 as applicable.
 FY 00 Year-to-Date Obligations: Obligations for fiscal year '00.
 Project Balance: Cost Estimate - (Prior Year Obligations + Fiscal 00 YTD Obligations)
 DØ FY 00 Plan: The M&S funds allocated to the Project/Sub-Projects as extracted from the current schedule.
 DØ FY 00 Balance: DØ FY 00 Plan - FY 00 Year-to-Date Obligations

DØ Upgrade Monthly Progress Report

for the month of January, 2000



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
YTD ACTUAL	962.6	1,199.8	1,664.6	2,169.3								
YTD PLAN	843.0	1,164.0	1,316.0	1,754.0	2,076.0	2,845.0	3,158.0	3,439.0	3,884.0	3,884.0	3,884.0	4,086.0

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Active MOUs as of 1/31/00

<u>INSTITUTION</u>	<u>EQUIPMENT</u>	<u>R&D</u>	<u>COSTED</u>
Boston University	298,200	5,200	8,776
Brookhaven National Laboratory	236,439		171,357
Brown University	856,867	106,000	152,644
California State University, Fresno	26,160		2,092
Columbia University, Nevis Labs	140,000		107,937
DAPNIA / Saclay	0	0	0
IN2P3	0	0	0
Indiana University	65,000		23,880
Institute for High Energy Physics (IHEP)	404,512	15,000	218,414
Joint Institute for Nuclear Research (JINR)	996,902	22,000	935,398
Kansas State University	298,620	100,012	152,725
Louisiana Tech University	80,854		51,708
Michigan State University	1,445,027		1,011,951
Moscow State University	238,400		219,200
NIKHEF / Amsterdam	0	0	0
Northern Illinois University	133,000	18,000	103,600
SUNY at Stony Brook	1,105,750	20,000	183,427
University of Arizona	747,648	78,100	417,869
University of Calif, Davis		9,720	0
University of Calif, Irvine	48,800		28,449
University of Calif, Riverside	89,116		84,310
University of IL, Chicago	129,103	22,000	91,042
University of Kansas, Center for Research, Inc.	16,000		0
University of Maryland	221,000		190,764
University of Michigan	206,500		167,897
University of Nebraska, Lincoln	95,913		0
University of Notre Dame	167,000	77,000	222,774
University of Oklahoma	43,000		30,085
University of Texas, Arlington	126,764		90,655
<u>University of Washington</u>	<u>50,640</u>	<u>5,250</u>	<u>38,538</u>
 Total Fermilab Funds:	 <u>\$8,267,215</u>	 <u>\$478,282</u>	
 Total Costed:	 4,465,467	 240,024	 <u>\$4,705,491</u>
 Total Open Commitments:	 <u>\$3,801,748</u>	 <u>\$238,258</u>	

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Reportable Milestones Summary

<u>Done</u>	<u>Reportable Milestones</u>	<u>Project</u>	<u>Date</u>	<u>Baseline</u>	<u>Var.</u>
X	M1-Solenoid Delivered to Fermilab	Solenoid	5/12/97	5/12/97	0 w
X	M2-VLPC Production 50% Complete	VLPCs	8/31/97	8/31/97	0 w
X	M2-Central Preshower Module Fabrication Complete	Central Preshower	12/16/97	12/16/97	0 w
X	M2-Central Preshower Installed on Solenoid	Central Preshower	5/21/98	5/21/98	0 w
X	M1-Solenoid Installed and Tested	Solenoid	9/30/98	9/30/98	0 w
X	M2-Muon Forward Trigger Counter Assembly 10% Complete	Muon Forward Trigger	10/12/98	10/12/98	0 w
X	M2-Forward Preshower Module Fabrication Begun	Forward Preshower	11/4/98	11/4/98	0 w
X	M2-Muon Forward Tracker MDT Assembly 10% Complete	Muon Forward Tracker	1/29/99	1/29/99	0 w
X	M2 - Assembly Design Complete	Fiber Tracker	3/5/99	3/5/99	0 w
X	M2-First Cylinder Complete	Fiber Tracker	9/2/99	9/2/99	0 w
X	H Half-Wedge Fabrication 20% Complete	Silicon Tracker	10/15/99	10/15/99	0 w
X	3 Chip Ladder Fabrication 80% Complete	Silicon Tracker	10/26/99	10/20/99	0.6 w
X	Arrival Of C-Layer MDT Modules At FNAL	Muon Forward Tracker	11/3/99	10/22/99	1.7 w
X	9 Chip Ladder Fabrication 20% Complete	Silicon Tracker	11/4/99	11/3/99	0.2 w
X	M3-Fiber Tracker Ribbon Fabrication 50% Complete	Fiber Tracker	11/5/99	11/12/99	-0.9 w
X	First Readout Crate Installed & Working	Silicon Electronics	11/16/99	12/2/99	-2 w
X	SCA Testing Complete	Calorimeter Electronics	11/23/99	12/15/99	-2.8 w
X	MDT ADB Fabrication Complete	Muon Electronics	12/2/99	12/2/99	0 w
X	SLICs Received	Trigger	12/10/99	11/10/99	4 w
X	F Wedge Assemblies 20% Complete	Silicon Tracker	1/24/00	1/19/00	0.4 w
X	6 Chip Ladder Fabrication 20% Complete	Silicon Tracker	1/31/00	1/3/00	3.9 w
X	MDC Fabrication Complete	Muon Electronics	1/31/00	12/13/99	5 w
X	M2-Muon Electronics Preproduction Installation Complete	Muon Electronics	1/31/00	12/13/99	5 w
X	M2-Fiber Tracker Assembly Begun	Fiber Tracker	2/1/00	12/6/99	6.2 w
X	M3-Establish Single Crate Internal Data Movement	Trigger	2/17/00	1/6/00	6 w
	Shaper Hybrid 50% Complete	Calorimeter Electronics	2/22/00	5/9/00	-11 w
	All Pixel Octants Assembled	Muon Forward Trigger	2/22/00	4/4/00	-6 w
	M3-1st Forward Preshower Detector Complete	Forward Preshower	2/24/00	1/12/00	6.2 w
	FEB, CB Production Complete	Muon Electronics	2/28/00	1/3/00	8 w
	M3-Fiber Tracker Cylinders 8, 7, 6, and 5 Complete	Fiber Tracker	3/2/00	1/28/00	5 w
	M3-Fiber Tracker Ribbon Fabrication Complete	Fiber Tracker	3/6/00	3/6/00	0 w
	9 Chip Ladder Fabrication 80% Complete	Silicon Tracker	3/10/00	3/27/00	-2.2 w
	M2-All Muon Forward Tracker MDT Modules At Fermilab	Muon Forward Tracker	3/15/00	3/10/00	0.6 w
	Waveguide Production 50% Complete	Fiber Tracker	3/16/00	1/29/00	6.8 w
	M2-First Silicon Tracker Barrel/Disk Module Complete	Silicon Tracker	3/17/00	1/24/00	7.8 w
	M3-ICD Tile Modules Ready	Intercryostat Detector	3/17/00	1/18/00	8.6 w
	M3-Level Ø-South Installed	Luminosity Monitor	3/23/00	2/9/00	6.2 w
	M2-ICD Modules Arrive at Fermilab	Intercryostat Detector	3/24/00	1/25/00	8.6 w
	H Half-Wedge Fabrication 80% Complete	Silicon Tracker	3/29/00	2/23/00	5 w
	M3-InterCryostat Detectors Installed	Intercryostat Detector	3/31/00	2/1/00	8.6 w
	Module Fabrication and Testing Complete	Forward Preshower	3/31/00	12/10/99	14 w
	Preproduction MTCxx, MTFB, and MTCM Complete	Trigger	4/3/00	1/24/00	10 w
	Multichip Modules Received	Fiber Electronics	4/5/00	2/23/00	6 w
	M3- Cal Readout Available to L2	Trigger	4/5/00	2/11/00	7.6 w
	M3-2nd Forward Preshower Detector Complete	Forward Preshower	4/7/00	3/8/00	4.4 w
	6 Chip Ladder Fabrication 80% Complete	Silicon Tracker	4/18/00	3/14/00	5 w
	M2-Calorimeter Preamp System Test Complete	Calorimeter Electronics	4/18/00	3/31/00	2.4 w
	Steady DAQ Running	Online	4/20/00	3/31/00	2.7 w
	SFE, SRC Fabrication Complete	Muon Electronics	4/24/00	2/3/00	11.5 w
	Ten 8-chip Analog Boards Available	Fiber Electronics	4/26/00	4/19/00	1 w
	M3-Calorimeter CC,ECN Preamp Installation Complete	Calorimeter Electronics	5/2/00	3/31/00	4.4 w
	M3-Fiber Tracker Ribbon Mounting Complete	Fiber Tracker	5/3/00	4/20/00	1.9 w
	F Wedge Assemblies 80% Complete	Silicon Tracker	5/3/00	4/26/00	1 w

DØ Upgrade Monthly Progress Report

for the month of January, 2000

Drawers Ready	Intercryostat Detector	5/10/00	12/14/99	19.2 w
Alpha Cards Received	Trigger	5/15/00	5/15/00	0 w
M2-Fiber Tracker Assembly Complete	Fiber Tracker	5/17/00	5/4/00	1.9 w
MBTs Received	Trigger	5/18/00	3/16/00	9 w
MRC, MFC Production Complete	Muon Electronics	5/24/00	3/27/00	8.4 w
M3-VLPC Cassette Assembly 50% Complete	VLPCs	6/5/00	4/12/00	7.4 w
10 Digital Boards Available	Fiber Electronics	6/8/00	3/22/00	11 w
M3-L3 Operational (One Full Chain)	Trigger	6/29/00	6/1/00	4 w
M3-VLPC Cryo System Operational	VLPCs	7/7/00	6/12/00	3.6 w
B-Layer Octants Assembled	Muon Forward Tracker	7/14/00	4/18/00	12.2 w
All MDT Octants Assembled	Muon Forward Tracker	7/14/00	7/14/00	0 w
Global Installation Complete	Trigger	7/21/00	7/12/00	1.4 w
L2 Muon Installation Complete	Trigger	7/31/00	7/26/00	0.6 w
M3-Waveguide Production Complete	Fiber Tracker	8/2/00	6/5/00	8.4 w
Mixer Boards Ready	Fiber Electronics	8/3/00	6/22/00	5.8 w
PDT Commissioning Complete	Muon Central	8/7/00	6/9/00	8 w
L2 CTT Installation Complete	Trigger	8/7/00	8/9/00	-0.4 w
H-disks Ready	Silicon Tracker	8/15/00	7/3/00	6 w
Timing System Installed	Calorimeter Electronics	8/18/00	8/18/00	0 w
Daughterboard Vendor Production Complete	Calorimeter Electronics	8/21/00	6/16/00	9 w
M3-All Silicon Tracker Barrels/Disks Complete	Silicon Tracker	8/25/00	8/25/00	0.2 w
L2 Cal Installation Complete	Trigger	9/5/00	8/21/00	2 w
Production MTCxx, MTFB, and MTCM Complete	Trigger	9/7/00	6/27/00	10 w
CFA Commissioning Complete	Muon Central	9/13/00	7/10/00	9.3 w
Central Silicon Complete & Ready To Move To DAB	Silicon Tracker	9/18/00	9/18/00	0.2 w
M1-Central Silicon Complete	Silicon Tracker	9/18/00	9/18/00	0.2 w
M3-Muon Level 1 Trigger Preproduction Testing Complete	Trigger	9/20/00	4/18/00	21.6 w
M2-Silicon Tracker Installed in Solenoid/Fiber Tracker	Silicon Tracker	9/25/00	9/25/00	0.2 w
M3-Trigger Level 2 Commissioned	Trigger	10/3/00	9/21/00	1.6 w
Muon Forward Tracker B-Layer Planes Installed	Muon Forward Tracker	10/9/00	6/15/00	16 w
All MDT Planes Installed	Muon Forward Tracker	10/9/00	8/4/00	9 w
BLS Motherboard Assembly Complete	Calorimeter Electronics	10/10/00	8/7/00	9 w
M3-VLPC Cassette Assembly Complete	VLPCs	10/13/00	8/22/00	7.4 w
All Muon Forward Trigger Detector Planes Installed	Muon Forward Trigger	10/30/00	8/25/00	9 w
M1-Begin Shield Wall Removal/Ready to Roll-in	Master	11/1/00	11/22/00	-3 w
M2-Calorimeter BLS Assembly Complete	Calorimeter Electronics	11/30/00	9/26/00	9 w
M2-Muon End Toroids Installed on Platform	Master	1/18/01	11/15/00	8.1 w
M1-Detector Rolled-in and Hooked Up	Master	2/13/01	2/2/01	1.3 w